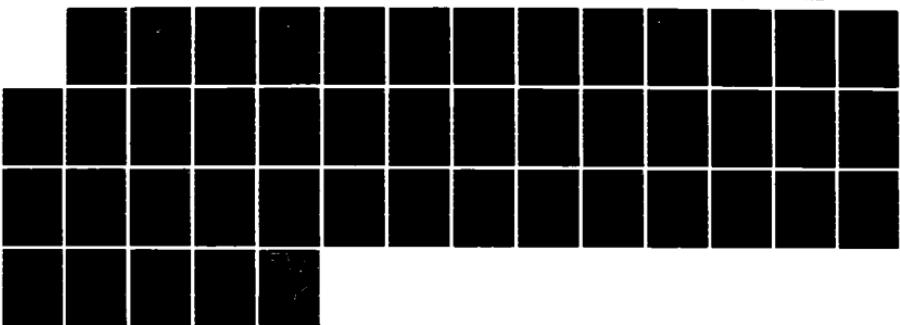


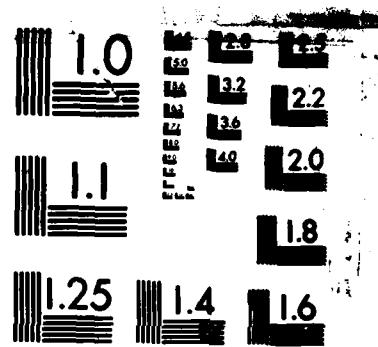
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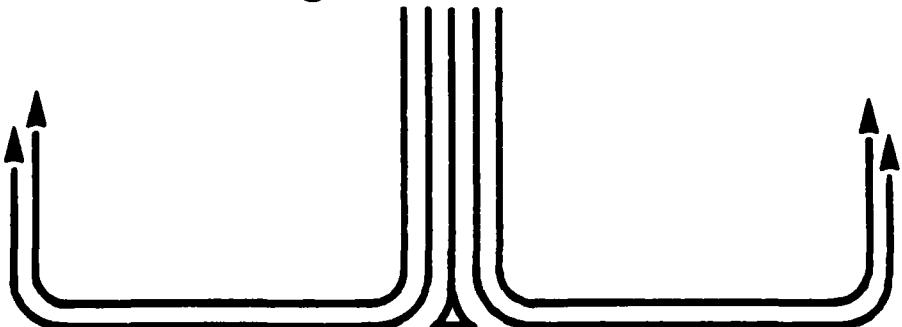
STUDENT REPORT

MIDDLE MANAGEMENT EXPERIENCE
IN SYSTEMS ACQUISITION:
CAN IT BE IMPROVED?

MAJOR RANDALL L. RAY 86-2085
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REPORT NUMBER 86-2085

TITLE MIDDLE MANAGEMENT EXPERIENCE IN SYSTEMS ACQUISITION:
CAN IT BE IMPROVED?

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Submitted to the faculty in partial fulfillment of
requirements for graduation.

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PREFACE

During the four years in which the author was assigned to the Peacockepr Program Office, he witnessed a steady influx of young officers. These officers--many of whom were recent college graduates with little acquisition experience or training--often replaced officers with four to eight years experience in major subsystem design, development, and deployment. They were given responsibility for requirement determination, equipment and interface specification, design documentation, and prototype fabrication and test, as well as financial control, contract conduct, and contractor interface. All of these tasks are constrained by numerous regulations and public laws. The young, inexperienced project officer with such vast responsibilities was overwhelmed and frustrated, and as a result, was often ineffective as a manager. This report is therefore aimed at analyzing the reasons for the current drain of experience in the acquisition field and evaluating three potential alternatives for offsetting the lack of experienced middle management acquisition officers.

The author gratefully acknowledges the assistance of several people in preparing this report. First, Major Roger F. Wickert reviewed the drafts and provided guidance and invaluable advice which kept the thrust of the report in focus. Further, several fellow course officers provided candid comments when they reviewed the project in its early formulation stage. Finally, the report could not have been completed on time without the review and comment provided by the author's wife, Beth, and the patience of his whole family.

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ABOUT THE AUTHOR

Major Randall L. Ray holds both Bachelor of Science and Master of Science degrees from Southern Methodist University in Dallas, Texas, and has 13 years experience in development engineering in the United States Air Force. Having been commissioned via the Reserve Officer Training Corps program, he entered the Air Force in July, 1973. His first assignment was with the Air Force Avionics Laboratory at Wright-Patterson Air Force Base, Ohio, as an electronics engineer. In this job he was tasked to establish a computer aided design facility to support the integrated circuit fabrication facility already in place. After attendance at Squadron Officer School, Major Ray was reassigned in July, 1977, to the European Office of Aerospace Research and Development in London, England. As Chief of Research and Development Electronics, he was responsible for reviewing European and Middle Eastern research and development programs, as well as developing cooperative efforts between USAF laboratories and Allied nation counterparts and/or Allied industry. He attended the Defense Systems Management College Program Manager Course in late 1980 before reporting to the Ballistic Missile Office at Norton Air Force Base, California. While at Norton, Major Ray was the project officer for the Peacekeeper Intercontinental Ballistic Missile secure code processing, and secure command and control software developments. He left the Ballistic Missile Office in July 1985 to attend the Air Command and Staff College at Maxwell Air Force Base, Alabama.

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REPORT NUMBER 86-2885

AUTHOR(S) MAJOR RANDALL L. RAY, USAF

TITLE MIDDLE MANAGEMENT EXPERIENCE IN SYSTEMS ACQUISITION:
CAN IT BE IMPROVED?

I. Purpose: The purpose of this staff analysis is to evaluate whether increased training, increased civilianization, and/or restructured acquisition career management can offset the effects of the shortage of experienced systems acquisition middle managers in the USAF.

II. Problem: In the last decade, management of Air Force weapon systems development has become increasingly complex as technological advances in electronics, engines, airframes, and composite materials have been incorporated into designs and numerous new regulations and guidelines for acquisition have been imposed. Thus, today, weapon systems acquisition management requires trained, experienced specialists rather than generalists as it did in the past. In 1979, however, Air Force management identified a shortage of experienced systems acquisition middle managers. Despite several initiatives (such as the Science and Engineering Bonus) there is still a shortage. Furthermore, more advanced weapon systems (such as the B1-B bomber and the Peacekeeper missile) and more far-reaching research and development programs (such as the Strategic Defense Initiative) are calling for additional experienced acquisition managers. In

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April, 1985, a study by Air Force Systems Command (AFSC) concluded there is a shortage in the 26xx, 27xx, and 28xx career fields in AFSC of 900 captains and 550 majors and lieutenant colonels and therefore, the "Acquisition management development program [is] deficient" (22:5-6).

III. Data: In order to grasp a basic understanding of the causes of the shortage of acquisition managers, applicable studies by Air Command and Staff College and Air Force Institute of Technology students were reviewed, as well as the results of the recent Air Force Systems Command study. The conclusions of these studies are documented in this analysis along with the author's conclusions drawn from the results of a Student-Neuman-Keuks one way comparison of the acquisition officer data in the Organizational Assessment Package (OAP) data base at the Leadership and Management Development Center (LMDC) at Maxwell Air Force Base. The LMDC data base contains responses from 958 acquisition officers among a total of 12,624 officers. The causes of the shortage of acquisition officers thus determined were used in the analysis of three potential actions to offset the effects of the shortage.

In determining the effectiveness of the three potential actions--increased training, increased civilianization, and/or restructured career management--applicable Department of Defense Directives, Air Force Regulations, Congressional reports, published articles, and published books were reviewed and analyzed.

IV. Conclusions: The OAP is designed to measure an individual's response to 21 job related, performance, motivational, and interpersonal relationship factors. The data base at LMDC indicates acquisition officers with eight years or less time in service are significantly less satisfied than the non-acquisition officers in 13 out of the 21 factors. Acquisition officers expressed dissatisfaction with the job performance goals, the degree of repetition in their work, the significance of their work, the amount of feedback provided, the job related training received, and the general organizational climate. Of particular significance to this study is the lack of satisfaction with job related training.

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Can the impact of the shortage of experienced military acquisition personnel on weapon system acquisition be offset by increased training, increased civilianization, and/or restructured acquisition career management? The study suggests only one of these three alternatives--increased civilianization--may offset the effects of the shortage in the short-term. There is, however, a drawback to this approach: If such positions are filled by civilians, leadership positions may not be available for military officers once their training is complete. Furthermore, the literature indicates there is a salary disparity between industry and government service and a nationwide shortage of scientists and engineers. Therefore, there may not be enough qualified civilians available to manage Air Force system acquisitions. In the long-term, the study concludes training is available and acquisition career management can be restructured to build a pool of experienced, certified acquisition managers.

V. Recommendations: The author recommends a restructure of the management of the acquisition career field following the guidelines of the Army's Materiel Acquisition Management program. The emphasis of the management of this career field should be on the establishment of individually tailored career progression paths which include early acquisition training and "gate" criteria to be met during each phase of career development. Furthermore, once in the acquisition management career field, assignments should be monitored by personnel officers specifically charged with insuring the Air Force has a pool of well-trained and experienced talent from which to fill the position requirements of program offices. The restructure will require appropriate sections of the regulation describing career development, AFR 36-23, be revamped in order to define "gate" criteria, establish acquisition career management action offices, define acquisition career assignment criteria, and develop and document tailored career progression paths. If such a vast restructure is accomplished, USAF institutional commitment to resolution of the shortage will be evident.

Chapter One

INTRODUCTION

BACKGROUND

In the 38 years since the formation of the United States Air Force many major weapon systems have been designed, developed, produced, and deployed. These systems have become increasingly complex as technological advances in electronics, engines, airframes, and composite materials have been incorporated to satisfy requirements for terrain following, multiple target tracking, better accuracy, better maneuverability, greater reliability, higher speed, lower radar cross section, etc. As weapon systems have become more sophisticated, the training, operation, and maintenance they require have in turn demanded specialized skills and equipment. The technology revolution has thus contributed to a trend away from the generalist Air Force officer to the specialist both in weapon system operators and in weapon system developers.

The technology revolution has also been a major factor in the cost of today's weapon systems compared to those of ten years ago. The total Department of Defense appropriations for research, development, test, and evaluation in Fiscal Year 1983 was 202% greater than in Fiscal Year 1974, and the appropriation for procurement was up by 369% (2:iii). Certainly some of this cost growth is also attributable to inflation, to changes in the technical requirements, to technical risk, and to several Congressionally-mandated budget restraints. In addition, the President's Private Sector Survey on Cost Control, also known as the Grace Commission, suggested in 1983 that a primary cause of cost growth in weapon systems is lack of effective management (2:iii).

DOD recognized the need for specialists in weapon system acquisition, as well as effective managers, as early as 1974, when DOD Directive 5000.23 was issued by Deputy Secretary of Defense W.P. Clements. The purpose of the directive was to establish "policy for the selection, training, and career development of DOD personnel who are required for the management of major defense systems acquisition" (12:1). The directive further stipulates that general officers, colonels, or civilian

equivalents should be considered for assignment as program managers only if they have program management or systems acquisition experience. Air Force Regulation 800-2 further requires the program manager and the program office staff to weigh equally "cost, schedule, performance, supportability, training requirements, and reliability and maintainability" (17:6). Since the program manager is the single person responsible for the weapon system development, he must have a strong background in each of these areas in order to fulfill this requirement. Why, then, is effective management an issue as late as the 1983 Grace Commission Report as indicated above?

The answer is that DOD (and the Air Force, in particular) is experiencing a shortage of seasoned acquisition officers. Lt Gen L. A. Skantze, then Commander of the Aeronautical Systems Division at Wright-Patterson Air Force Base, stated in 1979, "We are back-filling jobs that were held by captains and majors and lieutenant colonels with second lieutenants. A man with one year of experience replaces a man with 12. The experience exchange is disastrous" (5:45).

The same concern was again voiced in 1982 by General R.T. Marsh in the following words:

As Commander of Air Force Systems Command (AFSC), I rely daily on highly qualified scientists and engineers to make tough decisions dealing with the acquisition of the most complex, sophisticated capable systems in the world. Unfortunately, I do not have all the technically qualified and experienced people I need. This shortage hampers the ability of my command to fulfill its mission (6:25).

THE SHORTAGE IN FOCUS

In the same article which quoted Lt Gen Skantze above, the shortage of engineers in the Air Force was enumerated at 900 in 1979 (5:45), and in the article written by Gen Marsh (quoted above) the shortage in the Air Force was quoted as nearly 1,100 --over 500 of those vacancies were in Systems Command in 1982 (6:30). Despite several initiatives aimed at reversing the trend, the shortage appeared to be worsening. Of even greater concern was the drain on experience mentioned previously. Meanwhile more advanced weapon systems (such as the B1-B bomber and the Peacekeeper missile) and more far-reaching research and development programs (such as the Strategic Defense Initiative) were calling for more engineers and program managers, as well as more experience. Thus, the Commander of Air Force Systems Command directed a study be initiated in 1984 to address the shortfall between the authorized and the assigned strength, and

the experience available versus the experience needed in the middle management acquisition career fields (22:1).

In scoping the analysis to be undertaken at Systems Command two limitations were adopted; these will be adhered to in the remainder of this report. First, the analysis was limited to officers in the science, engineering, computer, contracting, logistics, financial/comptroller, and program manager career fields. For the remainder of this report, the author will limit the discussion to a subset of the AFSC group--the 26xx-29xx career fields. Second, AFSC concentrated the analysis on the manning at the several product divisions directly responsible for weapon systems acquisition (such as Aeronautical Systems Division, Electronic Systems Division, and Space Division). Although the supporting functions such as test centers and laboratories are also of concern, the highest percentage of acquisition officers are currently assigned to the product divisions, and the trends were expected to show more predominantly there than in the support functions. Finally, the study was aimed at identifying shortages of acquisition officers in the ranks of captain, major, and lieutenant colonel.

The AFSC study concluded there is a shortage of all three grades (captain, major, and lieutenant colonel) in the 26xx, 27xx, and 28xx career fields. In fact, as of April, 1985, there are 550 fewer majors and lieutenant colonels, and 900 fewer captains, assigned to these career fields than authorized (22:5). Furthermore, the engineering career field was manned with 60 percent lieutenants. The bottom line conclusion of the interim report issued in June, 1985, stated: (1) "The command is suffering from an acute shortage of experienced military officers although fully manned in acquisition personnel overall;" and (2) "Acquisition management development program [is] deficient" (22:5-6).

PROBLEM STATEMENT AND SCOPE

In light of the shortage of acquisition officers described above, AFSC is developing approaches to combat the identified shortfalls. Currently under consideration are initiatives to develop and implement an acquisition officer training and development program to satisfy the long-term shortage anticipated and an initiative to increase the use of civilian middle managers to satisfy the short-term concerns. The author is not, however, convinced either approach adequately works the concern expressed by Air Force general officers. Therefore, the problem to be addressed by the remainder of this report is expressed as follows: Can the impact of the shortage of experienced military acquisition personnel on weapon system acquisition be offset by increased training, increased civilianization, and/or

restructured acquisition career management?

In this report the following limitations and/or definitions will apply unless specifically stated otherwise:

1. "Acquisition officers" will include United States Air Force officers in the 26xx, 27xx, 28xx, and 29xx career fields who are/have been assigned to an AFSC product division.
2. The term "middle manager" will refer to senior captains (greater than four years time in grade), majors, and lieutenant colonels.
3. The term "program manager" will be defined per AFR 800-2 as the "single Air Force manager (system program director, program or project manager, or system or item manager) during any specific phase of the acquisition life cycle" (17:2).

REPORT ORGANIZATION

Every attempt is made to scope the problem, as well as any ongoing initiatives and solutions in view of the current environment. Therefore, many of the sources are professional journals and current study initiatives augmented as appropriate by the author's own experiences as an acquisition middle manager at the Peacekeeper Program Office. Chapter Two attempts to identify and scope some of the causes of the current shortage of experienced managers in the acquisition career field so that the problem stated earlier can be narrowed. Chapters Three, Four, and Five briefly review the proposed solutions to the problem--increased training, civilianization, and career development; and Chapter Six presents conclusions and recommendations.

Chapter Two

CAUSES OF THE SHORTAGE OF ACQUISITION OFFICERS

BACKGROUND

Before turning the reader's attention to the task of judging the effectiveness of various approaches to offsetting the effects of the shortage, it is important to grasp a basic understanding of the causes of the shortage. Some of the contributing factors are certainly well outside the influence of Air Force programs or policies--such as a nationwide lack of students training in the engineering professions; but other factors may be within the Air Force realm of influence. This latter group of factors will be addressed here. Examples of potential causes of the shortage follow:

1. Job Dissatisfaction. Dissatisfaction with one's job might be caused by lack of responsibility or authority, lack of challenging assignments, or lack of accomplishment or progression.
2. Lack of Motivation. Job motivation is the degree to which a job instills internal desire to do one's best.
3. Lifestyle Limitations. Areas of concern in this factor might include tour length, excessive temporary duty, pay and benefits, etc.
4. External Opportunities. Experienced, well-trained engineer/managers are in high demand in industry.
5. Disillusionment. Young officers may not feel that they fit in, or they may not like the Air Force profession as well as they do the engineering profession.

Several studies have focused on the above causes and their relationship to the retention of experienced acquisition officers.

In 1972 Major John Stratford analyzed the impact of motivational policies on acquisition managers. He suggested that "Motivation of individuals is . . . an important key to a successful program to improve system acquisition management. This is especially true since program management places a high stress on the individual" (24:54). Major Stratford's analysis of the acquisition manager's needs followed Maslow's hierarchy of basic individual needs (1:80-91), and he determined that an

internal motivational program should address the esteem and self-actualization needs (24:60). He then suggested the normal customer (USAF) and contractor relationship supplied a degree of esteem, and the trend in DOD toward decentralization and delegation of authority would generate a feeling of participation which would work the self-actualization requirement. A program office must, however, delegate authority down to the middle management level in order to realize a motivational gain. Major Stratford identified a void in the Air Force external motivation program. He found, and the author concurs, that there is no motivation to enter the acquisition field (24:62). The author believes there are, in fact, aspects of the acquisition career field which are demotivating and frustrating, and these tend to turn prospective managers away. Examples are long working hours, potentially high rates of temporary duty, high stress, and lack of adequate authority to carry out the task at hand.

A second study conducted in 1975 by two students at the Air Force Institute of Technology looked at job satisfaction and how it relates to the system program office. This study determined there was no significant difference between job satisfaction reported at the various levels of acquisition management, but administrators and top level managers did perceive more satisfaction than those in lower echelons (23:57).

In 1980 Major Richard Thompson studied the retention rate of scientists and engineers in the Air Force as a research project at Air Command and Staff College. Specifically, he noted the retention rates for development engineers (28xx) and scientists (26xx) dropped below 50% in Fiscal Year 1979 (25:1). Using the Leadership and Management Development Center's Organizational Assessment Package, he attempted to relate management and supervision to the retention rate of engineers and scientists. Major Thompson's primary conclusion was "quality of management and supervision received is directly related to career intentions of Air Force scientists and engineers" (25:40). He also identified a direct tie to the technical competence of the supervisor, i.e., if the supervisor was less technically competent, the scientist or engineer was more likely to separate from the Air Force. Since acquisition managers are often supervisors of scientists and engineers, this direct tie supports the position stated in Chapter One that acquisition managers should have a strong technical background.

THE ORGANIZATIONAL ASSESSMENT PACKAGE: WHAT'S THE CURRENT CLIMATE?

In order to better understand the current situation, the author used the Organizational Assessment Package (OAP) to analyze the present scientist and engineering climate in the Air

Force. The DAP is a 109 question survey which is administered as an early step in a consultant visit by the Leadership and Management Development Center (LMDC). It contains a set of demographic questions, as well as questions designed to measure an individual's response to a wide range of job related factors, performance factors, motivational factors, and interpersonal relationship factors. For a more complete description of the DAP, the reader should study the third chapter of Major Thompson's report (25:18-25) or contact LMDC. The DAP data base used in this study included 950 acquisition officers from a total data base of 12,624 officers responding. The author further broke the acquisition officers into four groups--by years of service in the Air Force. The group labels, the division of the groups, and the population of each group is shown in Table 1. Group E is the full DAP officer data base less the acquisition officers.

<u>GROUP</u>	<u>YEARS IN SERVICE</u>	<u>POPULATION</u>
A	< 4	291
B	4-8	147
C	8-12	104
D	> 12	408
E	N/A	11,673

Table 1. DAP Comparison Groups

The attitudinal DAP survey questions are grouped to form 21 factors for statistical comparison. There are twelve factors aimed at assessing the job itself and the environment surrounding it, four factors aimed at assessing the pattern of activity and the interaction of individuals in the group, and five factors aimed at assessing the performance of the group. The 21 factors are listed below in that order and are numbered and defined the same way they are in the package provided by LMDC:

1. Factor 810-Job Performance Goals. Measures the extent to which job performance goals are clear, specific, realistic, understandable, and challenging (19:5).
2. Factor 812-Task Characteristics. A combination of skill variety, task identity, task significance, and job feedback designed to measure several aspects of one's job (19:5).

3. Factor 813-Task Autonomy. Measures the degree to which the job provides freedom to do the work as one sees fit; discretion in scheduling, decision making, and means for accomplishing a job (19:6).
4. Factor 814-Work Repetition. Measures the extent to which one performs the same tasks or faces the same type of problems in his or her job on a regular basis (19:6).
5. Factor 816-Desired Repetitive Easy Tasks. Measures the extent to which one desires his or her job to involve repetitive tasks or tasks that are easy to accomplish (19:6).
6. Factor 823-Job Related Training. Measures the extent to which one is satisfied with on-the-job and technical training received (19:6).
7. Factor 800-Skill Variety. Measures the degree to which a job requires a variety of different tasks or activities in carrying out the work; involves the use of a number of different skills and talents of the worker; skills required are valued by the worker (19:7).
8. Factor 801-Task Identity. Measures the degree to which the job requires completion of a "whole" and identifiable piece of work from beginning to end (19:7).
9. Factor 802-Task Significance. Measures the degree to which the job has a substantial impact on the lives or work of others; the importance of the job (19:7).
10. Factor 804-Job Feedback. Measures the degree to which carrying out the work activities required by the job results in the worker obtaining clear and direct information about job outcomes or information on good and poor performance (19:7).
11. Factor 806-Need for Enrichment Index. Has to do with job related characteristics (autonomy, personal growth, use of skills, etc.) that the individual would like in a job (19:7).
12. Factor 807-Job Motivation Index. A composite index derived from the six job characteristics that reflects the overall "motivating potential" of a job; the degree to which a job will prompt high internal work motivation on the part of job incumbents (19:8).
13. Factor 805-Performance Barriers/Blockages. Measures the degree to which work performance is hindered by additional duties, details, inadequate tools, equipment, or work space (19:9).

14. Factor 818-Management and Supervision. Measures the degree to which the worker has high performance standards and good work procedures. Measures support and guidance received, and the overall quality of supervision (19:9).
15. Factor 819-Supervisory Communications Climate. Measures the degree to which the worker perceives that there is good rapport with supervisors; that there is a good working environment; that innovation for task improvement is encouraged; and that rewards are based upon performance (19:9).
16. Factor 820-Organizational Communications Climate. Measures the degree to which the worker perceives that there is an open communications environment in the organization, and that adequate information is provided to accomplish the job (19:10).
17. Factor 811-Pride. Measures the pride in one's work (19:11).
18. Factor 817-Advancement/Recognition. Measures one's awareness of advancement and recognition, and feelings of being prepared (i.e., learning new skills for promotion) (19:11).
19. Factor 821-Work Group Effectiveness. Measures one's view of the quantity, quality, and efficiency of work generated by his or her work group (19:11).
20. Factor 822-Job Related Satisfaction. Measures the degree to which the worker is generally satisfied with factors surrounding the job (19:12).
21. Factor 824-General Organizational Climate. Measures the individual's perception of his or her organizational environment as a whole (i.e. spirit of team work, communications, organizational pride, etc.) (19:12).

Using the Student-Neuman-Keuls one way comparison technique, statistically significant (at the 0.05 level) differences were identified during review of the comparisons between each of the acquisition officer groups and the OAP data base (Group E) for the eight factors marked by an asterisk in Table 2. Acquisition officers were significantly less satisfied than the OAP data base in each case. Furthermore, officers with less than or equal to four years and officers with four to eight years in service (Groups A and B respectively) were significantly less satisfied than the other three groups with the following five additional factors:

1. Factor 812-Task Characteristics
2. Factor 823-Job Related Training
3. Factor 800-Skill Variety
4. Factor 802-Task Significance
5. Factor 824-General Organizational Climate

In addition, the Group B officers were significantly less

satisfied with the Management and Supervision Factor and the Work Group Effectiveness Factor than three of the other groups. Finally, although not statistically significant, the Job Related Satisfaction Factor indicated a trend toward all acquisition officers being less satisfied than the data base.

FACTOR	GROUP A LESS SATISFIED THAN	GROUP B LESS SATISFIED THAN	GROUP C LESS SATISFIED THAN	GROUP D LESS SATISFIED THAN
810*	C,D,E	E	E	E
812*	C,D,E	C,D,E	E	E
813	+	+	+	+
814*	E	E	E	A,E
816	+	+	E	E
823*	C,D,E	C,D,E	E	E
800	B,C,D,E	C,D,E	E	+
801	E	E	+	E
802*	C,D,E	C,D,E	E	E
804*	E	E	E	E
806	+	C	+	+
807	E	+	+	+
805	+	+	+	+
818	+	C,D,E	+	+
819	+	C,E	+	+
820*	E	E	E	E
811*	B,C,D,E	E	E	E
817	+	+	+	+
821	C,E	C,D,E	+	+
822	+	+	+	+
824	C,D,E	C,D,E	+	+

(Note: + Indicates no significant difference)

Table 2. Group Comparisons Showing Statistical Significance

CONCLUSIONS

Close scrutiny of the OAP survey data leads to two conclusions about the current USAF environment for the

acquisition officer. First, Table 2 shows 42 instances out of 84 possible ones where the acquisition officer is less satisfied than the data base as a whole. Thirty-three instances relate to the job itself or job enrichment which indicates the acquisition officer may not find the job environmental conditions as expected or the job itself as interesting, as meaningful, or as challenging. Second, in seven additional factors acquisition officers with less than 8 years service are significantly less satisfied than the data base with the organization, the significance of their work, or the training they are receiving. This is the group that the USAF needs to motivate to remain in service so the several years of experience are not lost, yet members of this group are less satisfied than members of the other groups in a total of 15 out of the 21 factors measured.

With a basic understanding of some of the causes of the shortage of acquisition middle managers as a foundation to study alternatives, the author will now focus on job related training--an area in which acquisition officers indicated less satisfaction than the DAP data base.

Chapter Three

WOULD INCREASED TRAINING HELP?

BACKGROUND

Among the several factors measured or calculated by the Organizational Assessment Package (OAP) and discussed in Chapter Two is one titled "Job Related Training." It attempts to determine whether an individual is satisfied with on-the-job and other technical training received. Table 2 indicates that all acquisition officers are significantly less satisfied with the technical training received than officers in the rest of the data base. Table 2 also shows officers with 8 years or less service time are significantly less satisfied with the training received than either the 8-12 year group or the over 12 year group. Unfortunately, no information is available on what training was desired, what training was received, or what training was not available.

Review of the demographic data in the OAP data base sheds some light on the training desires of the acquisition officers. Table 3 summarizes the education completed by each group:

COMPLETED A MINIMUM OF	GROUP A	GROUP B	GROUP C	GROUP D	GROUP E
Bachelors	99.6%	100%	100%	99.8%	98.8%
Masters	14.0%	46.3%	69.3%	86.8%	44.3%
PHD	0.3%	1.4%	1.0%	10.3%	8.4%

Table 3. Education Level Completed Versus Time in Service

Note that there is a trend toward higher education as an officer's longevity increases. In the case of acquisition officers, there is apparently a stronger desire to get a master's degree than the in rest of the DAP data base. The difference between the number of Group A officers (less than or equal to four years service) and the Group B officers (four to eight years service) who have earned a master's degree indicates a strong desire by acquisition officers to get more education early in their career. This trend toward higher education might be one reason the DAP showed significantly less satisfaction with "Job Related Training."

ACQUISITION TRAINING AVAILABLE

There are other reasons why technically trained individuals such as acquisition officers (who are trained primarily as scientists and engineers) desire more training. Dr. Franz A. P. Frisch in his article addressing recruitment and retention of engineers stated that continuing education will help keep the engineer in the forefront of the technology revolution and will broaden the engineer's knowledge of supporting disciplines as he or she moves in the traditional career path toward management (4:43). With respect to the acquisition arena, another reason why there is a desire for additional training is the acquisition environment itself. Department of Defense weapon system acquisition is described in the DOD Directive 5000.1 and is a very structured, complex, and unique process (11:--). Commander J. W. H. Fitzgerald at the Defense Systems Management College (DSMC) described it in this manner:

The products acquired often have unique military application, press the state of the art, are few of a kind, expensive, and difficult to produce. The buyer side of the relationship is often a monopsony (one buyer) and the seller side is often an oligopoly (few sellers). This market structure, the characteristics of the products, and the resultant interdependence of the organizations involved present the government acquisition management team with an extremely complex business arrangement. Adding to this complexity is the fact that the buyer is also sovereign. In this role, the government regulates such things as product characteristics, prices, profit levels, personnel policies, management systems, and access to markets (3:11).

There are two ways to get the training required to work effectively in such a complex environment--on-the-job (OJT) or

formal coursework. Although very effective in many cases, OJT for acquisition training is expecting too much. In the author's opinion, OJT is not appropriate for learning the myriad of regulations, understanding complex technical requirements and their interrelationships, learning how to maintain control of both the financial and technical parts of the program, understanding the roles of the acquisition team, and appreciating the power of the political arena in systems acquisition. Even using handbooks and guides such as those prepared by Air Command and Staff College students Major Mitchell Fleiszar (18:--) and Major Edward Nicastri (21:--), OJT is a time-consuming, difficult, and ineffective way of learning acquisition. The author's experience dictates formal coursework to be the most effective means of learning and understanding the acquisition business. Fortunately, there are several excellent courses offered to qualified Air Force officers.

The Air Force regulation on officer specialty code classification, AFR 36-1, states that full qualification as an Acquisition Management Officer (AFSC 2716) or as an Acquisition Project Officer (AFSC 2724) requires completion of one (or more in specific cases) of the following courses (14:A10-31, A10-34):

1. Air Force Institute of Technology (AFIT) Acquisition Management Course
2. Air Force Institute of Technology Intermediate Program Management Course
3. Introduction to Systems Command Acquisition Management
4. DSMC Program Management Course
5. DSMC Program Management for Functional Managers Course

Furthermore, AFR 50-5 describes application and selection procedures and contains descriptions of the AFIT courses (16:4-74 - 4-77).

The AFIT courses are on video tape and are structured to introduce the acquisition process early in an officer's career and reinforce this understanding as the officer gains more management responsibility. Thus, the first course is available to newly-assigned acquisition officers and each of the others requires an increasing acquisition experience level. The first DSMC course is primarily aimed at captains, majors, and lieutenant colonels with some acquisition experience. The author attended DSMC and has reviewed the AFIT course materials and feels both sets of courses fully satisfy the need for specific acquisition management training.

CONCLUSIONS

Good acquisition training is available. Why then are acquisition officers not satisfied with "Job Related Training"? There are three reasons. First, a newly-assigned acquisition

officer desires to get into the job and most supervisors are reluctant to release an enthusiastic individual for training. Once settled into the job, releasing an officer for training is even more difficult--it means doubling the workload for someone else. Second, it has been the author's experience that many newly assigned acquisition officers are not aware of what training is available or how they obtain information about it. Finally, there are neither formal nor institutional requirements to schedule an acquisition officer for training at a particular career point. This point is discussed further in Chapter Five.

Will increased training help offset the impact of the current shortage of middle management acquisition officers? No, it will not in the short-term. However, better management of the officers' training program may help retain those with acquisition experience for the long-term. Acquisition training is, however, a prerequisite for effective acquisition management. Thus, for the short-term, perhaps another solution such as increased civilianization should be considered.

Chapter Four

WOULD INCREASED CIVILIANIZATION HELP?

BACKGROUND

As noted in Chapter One, cost overruns and publicity about the abnormally high cost of specific items (hammers, pliers, coffee pots, etc.) have caused public, and Congressional, dissatisfaction with the weapon systems procurement process. This dissatisfaction along with the spiraling Federal deficit (and the ever-increasing percentage of the Federal budget going to weapon systems procurement) has spawned numerous Congressionally-mandated reforms. In recent years the Department of Defense Authorization Bills have included provisions requiring more competition and warranties. The same dissatisfaction caused the attention of the Office of the Secretary of Defense (specifically Deputy Secretary Frank Carlucci) to focus in 1981 on internal reform (the Acquisition Improvement Program) aimed at streamlining and decentralizing the acquisition process (9:2-7). In a further attempt to attack this concern head on, President Reagan, on 30 June 1982, established the President's Private Sector Survey on Cost Control with the following objectives:

Identify opportunities for increased efficiency and reduced costs achievable by executive action or legislation.

Determine areas where managerial accountability can be enhanced and administrative controls improved.

Suggest short- and long-term managerial operating improvements.

Specify areas where further study can be justified by potential savings.

Provide information and data relating to governmental expenditures, indebtedness, and personnel management (2:Preface).

The President's Private Sector Survey on Cost Control (also known as the Grace Commission) made 275 recommendations to the

Department of Defense alone. One of them, OSD 15: Improved Organization of the Acquisition Function, recommends consolidating the management of the acquisition process within the Office of the Secretary of Defense. This recommendation is considered by some to be the "most sweeping recommendation concerning procurement organization since the end of World War II" (20:CRS-31). In fact, during World War I President Woodrow Wilson indicated he was unconditionally opposed to a concept whereby an all-civilian agency would procure supplies and systems for the military (20:CRS-4); again, in 1943, under President Franklin D. Roosevelt a similar concept was suggested and rejected (20:CRS-14).

In both instances the arguments for and against remained the same. Arguments favoring this change stated that:

Procurement is a business function that can be better handled by civilians with more experience in the marketplace than by military officers.

Military men should be freed to concentrate on what they do best--fighting and defending the nation.

A civilian supply agency will ensure continuity of key personnel, reduce duplication, and achieve greater efficiency and economy (20:CRS-3).

Critics argued that:

In time of crisis, it is important for the sake of the nation's security for the military to exercise day-to-day control over weapons production. The chain-of-command relationships and knowledge of battlefield requirements insure greater responsiveness and reliability than is possible in a civilian-dominated arrangement.

Advantages of civilian participation are already present. Civilians control the Department of Defense, the defense budget formulation process in the White House and the Congress, and the individual military departments. Key positions at the highest levels are thus held by non-uniformed personnel who have a thorough understanding of the industrial/economic factors of defense acquisition (20:CRS-3).

CIVILIANIZATION:
WHAT IS THE CURRENT ENVIRONMENT?

Although the Grace Commission stopped short of recommending

consolidation of the military services acquisition function into an all-civilian agency, such a move is certainly on the minds of some congressmen (8:B-5). The author, however, finds the arguments favoring such an approach somewhat weak and without basis. First, where is DOD expected to find civilians with experience in the marketplace? Dr. Frisch noted in his article on recruiting and retention of civilian engineers that government has a difficult time competing for good engineers in the face of high salaries in the commercial world (4:41). Furthermore, General Marsh's article in 1982 stated that a Bureau of Labor Statistics manpower study projects a "net nationwide shortfall of 16,000 engineers each year" for the period 1980-1990 (6:26). Technical people will be difficult to find for both civilian and military careers. Second, although military men should concentrate on fighting and defending the nation, military men know better than anyone else what they need in the way of weapons to wage war. There are numerous unique environmental, reliability, safety, and security requirements that have no counterparts in the commercial marketplace. Where else in the marketplace must three or four levels of safety and security be designed into a weapon system to ensure that a nuclear "accident" does not destroy a whole city?

A second, and perhaps more palatable, alternative is to place more civilians in key acquisition positions for the short-term while training less experienced military officers for the long-term. If experienced civilian acquisition personnel are available, they should be used. In fact, if they are available in industry and can be persuaded to join the government work force, that is an excellent near-term solution, since it takes years to train a new officer. Use of experienced civilians in key positions also provides stability and corporate memory to the program office. A major drawback to this approach is the potential loss of leadership positions for military officers once training is complete.

CONCLUSIONS

Yes, if experienced civilian acquisition personnel are available, then increased civilianization will offset the impact of the shortage of middle management acquisition officers. However, the author questions whether or not experienced civilians are available since the engineer shortage is nationwide and the government faces strong competition from civilian industry. Air Force Systems Command (AFSC) initiated a program to recruit experienced civilian acquisition managers in the summer of 1985. One caveat on the AFSC program is that field commanders must make a conscious decision to maintain key field grade positions for military officers to assume when qualified (22:Atch). It is too early to tell whether they will be

successful or not.

At the end of Chapter Three, the author indicated better management of acquisition training might help retain those acquisition officers with experience, and, in Chapter Two, the author concurred with Major John Stratford's conclusion concerning the lack of motivation to enter the acquisition career field (24:62). Thus, the next chapter reviews the potential for restructuring acquisition career field management with these shortfalls in mind.

Chapter Five

ACQUISITION CAREER MANAGEMENT: CAN IT BE IMPROVED?

BACKGROUND

According to DOD Directive 5000.23 issued in 1974, "successful management of major defense systems . . . is primarily dependent upon experienced and competent individuals" (12:1-2). The same directive states, "Each major program is to be managed by a single individual (Program Manager) who is supported by a team of persons qualified in systems acquisition management" (12:2). The primary focus of the remainder of the directive is to direct DOD components to: 1) establish specific career fields for DOD personnel who are required for major systems acquisition management positions; 2) specify several standards and criteria to be considered when establishing the career field; and 3) establish guidelines for DOD component responsibilities such as selection, training, performance monitoring, and tenure of assignment of acquisition personnel (12:--).

There are several sections of this directive which appear to be directly related to the subject of enhancing the retention rate of experienced acquisition officers. First, under the heading of "Career Considerations" the directive states DOD components must:

Develop a career progression plan including: Training and professional education requirements; Identification of types of experience considered beneficial for assuming higher level Program Manager positions; Administrative Control; and Provisions for advancement based on demonstrated performance (12:2).

Second, under the heading of "Personnel Management", the directive states:

Performance measurements shall be developed and emphasized in order to insure that only the most competent individuals are retained and rewarded in the System Acquisition Management career field (12:3).

A performance monitoring system for all persons who are involved or aspire to be involved in the management of major defense systems will be maintained by each DOD Component. Selection of personnel for key positions in management of major defense systems will normally be made only from among those so tracked, and heavy reliance will be placed on performance records for determination of those best qualified (12:4).

Personnel should be selected on the basis of skills and experience needed to prosecute successfully a program or program phase regardless of military or civilian status (12:4).

Finally, the thrust of the directive is succinctly stated in the policy section in the following way: "Career opportunities shall be established to attract, develop, retain and reward outstanding military officers and civilian employees required as Program Managers, or as their principal deputies/assistants" (12:2). (The emphasis was added by this author.)

ACQUISITION CAREER MANAGEMENT:
HOW DID USAF IMPLEMENT DODD 5000.23?

In 1982 the DOD Office of the Inspector General was requested to review the military departments' implementation of DOD Directive 5000.23. The subsequent report concluded, "The Air Force's military officer program fully implemented the Directive" (13:2). The program which was reviewed is detailed in AFR 36-23. The objectives of career management as stated in the regulation follow:

The primary purpose of career management is to prepare an officer to assume additional responsibilities within the defense establishment. A secondary purpose is to prepare each officer for advancement. To accomplish these objectives, the Air Force offers, and encourages each member to seek additional intellectual and professional credentials. It is incumbent on each Air Force member to take advantage of as many programs as possible (15:9).

The regulation specifies the responsibilities of the individual officers, supervisors, commanders, the major command, the military personnel center, and Headquarters USAF. It further defines terms peculiar to career management such as career broadening, stabilized tours, executive development programs, directed duty assignments, and active duty service commitments, and describes how an officer establishes a career plan by

submitting an Officer Career Objective Statement (15:--).

In Part Two of the regulation, career progression guides are described for each Air Force specialty code. In particular the career progression guide for the 27xx specialty code is subdivided into five phases based on time in service. The phase definitions and the phasing of training and some assignments for the 27xx specialty code are shown in Table 4 (15:85-87).

PHASE	YEARS SERVICE	TRAINING OR ASSIGNMENTS
Initial	0-3	<p>Introduction to Aquisition Management</p> <p>Work with experienced Acquisition Specialists</p>
Intermediate Development	4-10	<p>Acquisition Related Specialty Course</p> <p>Responsible Manager for Specific Acquisition Functional Areas</p>
Advanced Development	11-16	<p>(No course specified)</p> <p>Major Program Office Assignment or Acquisition Management Staff</p>
Staff	17-21	<p>DSCMC Program Management Course</p> <p>Senior Command and Staff Duty</p>
Executive Leader	22+	<p>Attend Professional Meetings</p> <p>System Program Manager</p>

Table 4. Career Progression Guide for Acquisition Managers

Note that the training column of the Career Progression Guide suggests that acquisition officers take "Introduction to Acquisition Management" during the initial phase (0-3 years service) of the officer's career. The author concurs that the initial phase is appropriate, but suggests that the first six months is best. Unfortunately, as noted in Chapter Three, new officers are often not aware of training opportunities which are available. New acquisition officers should therefore plan to get intermediate or speciality acquisition training prior to the end of their initial career phase and aim for the Defense Systems Management College Program Management Course at about the eighth year in service.

The assignments column of the Career Progression Guide suggests "working with experienced managers and other systems acquisition specialists in management of specific system acquisition functional areas" (15:88) during the initial phase and taking the full responsibility during the intermediate development phase. The author's experience indicates that many new acquisition officers get the full responsibility much earlier--thus the suggestion above that training be scheduled earlier. Furthermore, assignment to a major system program office should come at about the eighth year followed by assignment to Air Staff at about the twelfth year (preferably in a capacity such as Program Element Monitor). The acquisition officer would then be prepared to plan and manage a major subsystem program at the end of the advanced development or beginning of the staff career phase. Such a career progression is reinforced by the Defense Procurement Improvement Act introduced by Senator Quayle on 26 March 1985 which states:

The third part of the bill is an effort to strengthen the quality of the acquisition work force. . . . By mid-1989, program managers will have had 8 years of prior experience in the acquisition, maintenance, and support of weapon systems, of which at least 6 years will have been spent in assignments in the . . . Air Force Systems Command, or Air Force Logistics Command (10:S3439).

These suggestions for training and assignments are not, however, precluded by the Career Progression Guide in AFR 36-23. Throughout the regulation the reader is reminded that the progression guides are tools and "provide assistance to individual officers, supervisors, career managers, and commanders in determining a logical and attainable career" (15:41). The problem is there is no institutional commitment by the Air Force to establish with the individual a reasonable, detailed career progression based on Air Force requirements, as well as the individual's background, training, and goals. Instead assignments are worked by the Air Force on an "as required"

basis, and training is provided only when individual request and availability match.

A recent Air Force Systems Command initiative is aimed at correcting the above problem. Its objective is to:

Select the best qualified, highest potential candidates, and concentrate training for both near term and long range objectives with the intent that both through concentrated specific training and selected assignment, these officers progress rapidly towards acceptance of duties as acquisition middle managers (22:atc).

The initiative which was implemented in June 1985 includes planning for short-term training, near-term career paths, and long-term follow-on career progression. In the staff summary sheet that describes this initiative, Air Force Systems Command recognizes the value of individualized career progression paths and plans to use such an approach--at least in the near-term (22:atc). Support has also been requested from other Air Force organizations, such as the Air University and the Military Personnel Center, in order to correct the other problem--lack of an institutionalized approach to acquisition career planning.

AN ALTERNATIVE APPROACH: ARMY MATERIEL ACQUISITION MANAGEMENT

Two years ago the U.S. Army established the Materiel Acquisition Management (MAM) career program for officers. According to Lieutenant Colonel Miscik's article in Program Manager in 1984, the MAM program establishes an institutional Army commitment toward "better and more efficient career management for officers in acquisition management" (7:46). The objectives of the MAM program are as follows:

To ensure that officers performing materiel acquisition management functions obtain specialized and intensive training, education, and developmental assignments.

To produce materiel acquisition managers with a broad perspective across the entire field of materiel acquisition management.

To maximize successful materiel acquisition management through controlled assignments of properly trained, developed, and certified MAM officers.

To ensure that MAM officers have opportunities for advancement and career satisfaction (7:49).

Similar to the AFR 36-23 progression guide, the MAM program is divided into three phases--the user/support development phase, the MAM development phase, and the certified manager phase. The first phase, user/support development, begins upon entry to active duty, lasts about six years, and allows the officer to enhance his educational background with experience in his chosen field. The second phase, MAM development, requires the officer to apply for acquisition management training. If the applicant meets established qualifications, including education, specialty, longevity, and demonstrated proficiency, he or she is considered by a selection board. All officers selected to participate enter the MAM development phase and their careers are managed with MAM objectives in mind. Specific MAM assignments, normally two, have been identified for this phase, as well as training--a nine week MAM course and the twenty week DSMC Program Management Course. Upon selection to lieutenant colonel, all MAM program officers are evaluated for entry into the third phase, certified manager. Those meeting the criteria and becoming certified will receive certified manager MAM assignments based upon the best qualified criteria (7:51).

CONCLUSIONS

Can Air Force acquisition career management be improved? As the Inspector General report indicated, the Air Force's current program fully implements the DOD Directive 5000.23 issued in 1974 (12:2). Nevertheless, as indicated in the narrative above, the current Air Force program can be improved by establishing individualized career progression paths similar to those outlined in the Army's MAM program. This will be discussed in greater detail in Chapter Six.

Can the impact of the current shortage of experienced weapon system acquisition middle managers on weapon system acquisition be offset by restructuring acquisition management career development? It is doubtful such an approach can help in the short-term because experience is gained by trial and error, rather than by being taught. However, in the long-term, restructuring acquisition management career development may well pay significant benefits in retaining better trained, more-experienced, and more-qualified acquisition managers. Recommendations for the restructuring of the acquisition management career field will be discussed in the next chapter.

Chapter Six

SUMMARY AND RECOMMENDATIONS

SUMMARY

This study was designed to answer one question: Can the impact of the shortage of experienced military acquisition personnel on weapon system acquisition be offset by increased training, increased civilianization, and/or restructured acquisition career management? In analyzing the question, the reader's attention was first focused on the magnitude and cause of the experience shortage. Through the use of the Leadership and Management Development Center's Organizational Assessment Package, the author concluded acquisition officers as a group are significantly less satisfied with their jobs and the environment surrounding them than other Air Force officers. It was then suggested the acquisition officer's education (generally technical in nature) may have been the catalyst for this dissatisfaction. The technical officer is torn between two professions: Arms and Engineering/Science.

On the one hand, the officer has technical training and today's Air Force needs specialists to design, develop, and procure weapon systems; yet, on the other hand, the Air Force whole man concept demands allegiance to the profession of arms. On the one hand, engineers and scientists are better paid in industry; yet, on the other, a career in the Air Force can be very challenging and rewarding and may offer more responsibility and diversity than industry. Both the arms profession and the engineering/scientist profession require advanced training to remain in the forefront, but the training required by the one does not satisfy training requirements of the other. One way to address this apparent dichotomy in the acquisition officer is through job motivation and job satisfaction.

In Chapters Three, Four, and Five the proposed solutions to the shortage in middle management acquisition officers were discussed --training, civilianization, and restructured career development. Although rephrasing the training may help satisfy the less experienced acquisition officer, this report suggested that good training is available and agreed with the premise "Supervisors should encourage officers to apply for the required

schooling and make every effort to ensure their entry at the proper time" (15:41). This report further pointed out there is a shortage of scientists and engineers nationwide, and there is a large gap between industry salaries and Air Force salaries. Increased civilianization, therefore, probably will not impact the middle management shortage. While restructured acquisition management career development may have little effect on the shortage in the short-term, it could provide enough impact in the long-term to remedy the retention problem for the future.

RECOMMENDATION

At the end of Chapter Five, the author recommended a restructure of the acquisition management career field following the lines of the Army's MAM program. The emphasis should be on treatment of the acquisition managers as, to borrow Senator Roth's terminology, "Professional Armorers" (8:8-5). That is to say, the acquisition manager is a specialist in the business of design, development, and procurement of DOD weapon systems. The restructure of the career field should follow these guidelines:

1. Individually tailored career progression plans should be formulated for each acquisition management officer as soon as the officer enters the field.
2. A career pattern similar to the Army MAM program should be established with "gate" criteria required for acquisition management officers as they have been for pilots. The criteria should specify training, appropriate assignments, and demonstrated potential to be met during each phase of career development.
3. The career progression should call for early introduction of the officer to the very structured, complex, and unique process of DOD weapon systems acquisition through management and acquisition courses such as those offered by the Defense Systems Management College.
4. Once in the acquisition management career field, all assignments should be monitored by personnel officers specifically charged with insuring the Air Force has a pool of well-trained and experienced talent from which to fill the position requirements of program offices. Furthermore, assignment policy for experienced acquisition management officers should place the highest priority on placing them in acquisition management positions.

Such a restructure should be implemented from Headquarters USAF by revamping appropriate sections of AFR 36-23. The new regulation should specifically define how the individual career progression paths are determined and documented and should establish the "gate" criteria described above. It should also

establish a specific career management action office for acquisition officers, define criteria for acquisition management assignments, and set a tone which demonstrates an Air Force institutional commitment to resolve the shortage of acquisition officers.

Although an institutional commitment to extensive restructure of the acquisition management career field may on the surface seem to be applying "special" treatment to one small group of Air Force officers, the reader is reminded of two things which warrant this treatment. First, there is a shortage of experienced middle management acquisition officers because acquisition officers as a group are less satisfied with their job environments, the significance of the jobs, and the training provided. Second, as small a group as they are, the acquisition officers administer approximately 70% of the Air Force's annual budget (6:29). It would seem to be in the best interest of the Air Force to work actively toward providing the best training and job satisfaction possible for these officers. Furthermore, considering recent Congressional interest in effective acquisition management in the Department of Defense, if the USAF does not do a better job of managing systems acquisition, Congress may legislate a "better" way, such as the all-civilian agency originally recommended to President Wilson during World War I (20:CRS-4). Who knows best what weapons are required to wage war and understands best the numerous environmental, reliability, safety, security, and maintainability requirements unique to military systems acquisition? The author maintains the answer to both questions is the military, not the civilians.

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